CHAPTER 8

Strategy for Monitoring the Environment in the Coastal Zone

M. Jawed Hameedi

Located between the open ocean and the terrestrial domain the coastal regions of the world are characterized by intensive physical, biological and social interactions. In total, coastal areas comprise only 8 % of the worlds surface area but they are extremely attractive for human settlement and social activity due to their wealth of natural resources and amenities. They are biologically highly productive, hubs of industrial infrastructure and economic growth, and highly desirable for tourism and recreation. It is this very attraction that has led to intense pressures on the diverse and valuable resources of the coastal regions; pressures that are likely to -increase.

Just as today's population in coastal areas of the world is nearly the same as the entire global population in the 1950s, it is expected that in the coming 30 years coastal population will approximate the total global population today - 5.5 billion people (Weber, 1994). The trend of increasing population densities in coastal areas is much more pronounced in Asian countries than elsewhere. Megacities, such as Calcutta, Bombay, Shanghai, Seoul, and Karachi are already burgeoning from population growth. They are expected to become even bigger and be ranked among the top ten most populated cities in the world in the near future. Without a well-conceived strategy to -respond to population growth and space requirements, accelerated loss of habitats (e.g., wetlands, mangroves, seagrasses), vulnerability to -natural hazards (e.g., beach losses due to erosion and impoundment), and diminished economic potential (e.g., closure of recreational facilities, poor harvest of renewable resources, contaminated seafood, and loss of aesthetic value) are more likely to exacerbate. The present day collection of environmental problems and resource-use

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Conflicts could coalesce into -a series of national or regional crises within the foreseeable future.

In recent years, the concept of Integrated Coastal Zone Management (IC2M) has been advanced in order to anticipate and resolve complex coastal management issues, ranging from resource conservation, to improved environmental quality and amenities, to strengthened economic vitality, to-balanced human uses of the coastal zone. In essence, ICZM implies knowledge of the coastal environment, identification of policy issues and priorities; consideration of economics and legal issues relating to coastal resource use; and coordination of activities among layers (vertical structure) and branches (horizontal structure) of government (Bower *et al., 1994).* The World Coast Conference *'93* generated a framework for ICZM as *follows: ICZM involves the comprehensive assessment, set ting of objectives, planning and management of coastal ecosystems and resources, taking into account traditional, cultural and historical perspectives and conflicting interests and uses; it is a continuous and evolutionary process for achieving sustainable development (*IPCC, 1994). To put in a simpler perspective, ICZM could be used to address the question: Can developing nations commercialize, industrialize, and become affluent consumers

without ravaging their coastal and marine resources, grossly polluting their air and water, and endangering the health of their population?

This paper provides a framework, with a few illustrative examples from work done in the United States, for environmental monitoring in the context of ICZM. It is not intended as a blueprint for establishing a regional monitoring program in any particular country; rather, it provides a strategy to - define the program's scope within which a suite of measurement activities should be designed and streamlined to address the environmental issues in question. Specific topics such as biological and chemical analytical techniques, quality assurance protocols, data management, and information dissemination procedures are not included herein for the sake of brevity; their details can be found elsewhere (e.g., Hameedi, 1986, 1988; Danforth, 1988; ICES, 1992; Cantillo and Lauenstein, 1993; Lauenstein and Cantillo, 1993; Wise *et al*., 1993; Cantillo and Lauenstein, 1995).